Chemical Reclamation of Precious Metals to Reduce Environmental Contamination

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With the development of third world countries entering the technological space, E-waste is continuing to grow as a worldwide problem, and thus figuring out how to properly separate base materials from waste so they can later be recycled individually is an effort beneficial to the world as a whole. As such, chemical reclamation of metals from e-waste could serve as a widespread method for effectively recycling electronic waste. The initial hypothesis was that circuit boards that underwent this chemical processing would yield 70% of the original precious metal amount. For the chemical reclamation process, PCB boards–including ram sticks, CPU's, and motherboards– were removed from various laptops labeled as e-waste, and broken up and put into a solution of 4M HCL mixed with 3% hydrogen peroxide. This worked to separate all of the metals from the circuit boards by dissolving the thing layer in between the metals and the boards. After this, the resulting mixture was filtered and the remaining solids were transferred into another solution called Aqua Regia, in which the precious metals were dissolved. Sodium metabisulfite was then added to precipitate the precious metals, and then the yield was calculated. The results showed differing yields per trial, with the average around 65%. Although slightly under the hypothesized amount, these yields still provide a profit in every trial, and thus there is economic efficacy to the process. This varying yield is due to the fact that not all circuit boards have the same amount of metal on them, and this variability is an inevitable factor in recycling e-waste.

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